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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/607,532	06/27/2003	Keith W. Reiss	8107.002.US	6160

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EXAMINER	
SODERQUIST, ARLEN	

ART UNIT	PAPER NUMBER
1797	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/607,532	REISS, KEITH W.	
	Examiner	**Art Unit**	
	Arlen Soderquist	1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 26 June 2008.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-22 and 24-30 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) 1-15,20-22 and 24-30 is/are allowed.

6)☒ Claim(s) 16-19 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 12 July 2007 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

1. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schafer (Berichte der Bunsen-Gesellschaft, 1983) or van der Weide (SPIE, 1999 or NATO Science Series, II, 2001) in view of Zhang and Crosmer or Des Marais (last three newly cited and applied).

In the paper Schafer teaches a broadband submillimeter wave spectrometer system with on-line microcomputer data analysis substantially as claimed. A submillimeter wave spectrometer operating in the frequency range 100 to 800 GHz was constructed for the study of transient molecules in the gas phase. The instrument is shown in figure 1 and employs harmonic generation of millimeter wave frequencies and a He-cooled InSb photoconducting detector. A high degree of flexibility is achieved using an exchangeable free-space Pyrex absorption cell and a microcomputer for on-line data analysis. The spectrometer can be operated in a free-running video mode together with a fast signal averager or phase-locked to a microwave reference with source modulation. Pages 329-330 discuss the frequency control and measurement including the use of generated frequency markers. Pages 330-333 and figures 9 and 12 discuss and show the data acquisition and analysis including the use of the frequency markers to determine the frequency of the absorptions. The reproducibility of line center frequency measurements up to

600 GHz is ±10 kHz. Transitions with absorption coefficients of at least 3×10^{-8} cm^{-1} can be detected in the range from 150 to 250 GHz. Ground state rotational transitions of OCS between 200 and 690 GHz are reported and analyzed together with previous data. Schafer does not teach the analysis cell under vacuum or the use of a cold trap to prepare the sample for analysis.

The van der Weide papers have a similar disclosure and only the SPIE paper will be described. In the SPIE paper van der Weide discusses spectroscopy with electronic terahertz techniques. The authors report gas absorption spectra and energetic material reflection spectra measured with an all-electronic terahertz (THz) spectrometer. This instrument uses phase-locked microwave sources to drive picosecond GaAs nonlinear transmission lines, enabling measurement of both broadband spectra and single lines with hertz-level precision, a new mode of operation not readily available with optoelectronic THz techniques. The authors take 2 approaches to coherent measurements: (1) spatially combining the freely propagating beams from 2 coherent picosecond pulse generators, or (2) using a more conventional coherent source/detector arrangement with sampling detectors. The 1st method employs a dual-source interferometer modulating each harmonic of 1 source with a precisely-offset harmonic from the other source - both sources being driven with stable phase-locked synthesizers - the resultant beat frequency can be low enough for detection by a standard composite bolometer. Room-temperature detection possibilities for the DSI include antenna-coupled Schottky diodes. The first paragraph of the introduction teaches the need for integrated circuit sensors in the terahertz (THz) frequency region for multi-species gas sensing applications. The paragraph bridging pages 276-277 and the rest of the discussion on page 277 teach the use of solid state oscillators for generation of radiation in this region and the use of a solid state Schottky diode detection structure to detect the signal at room temperature. The prototype system that they had constructed was small (170 mm long, 120 mm wide, and 80 mm high) with the possibility of constructing an even more compact system being taught. The conclusion on page 283 presents some advantages for the system including an all electronic system that eliminates the need for moving parts and cost advantages. van der Weide does not teach the analysis cell under vacuum or the use of a cold trap to prepare the sample for analysis.

In the abstract Zhang teaches a submillimeter wave Fourier transform spectrometer with working wavelength in the region of 33-500 μm. The resolution is 1 cm^{-1}. A microcomputer is

used for the data acquisition and processing. The moving mirror is driven by a liquid-pressure machine for smooth moving. The displacement of the moving mirror is measured with a laser interferometer. The optical path system is evacuated to prevent adsorption of water vapor.
In the paper Crosmer teaches a cold trap fractionation as an organic analysis technique. Cold trap fractionation is proposed as a highly simplified, alternate approach to the gas chromatograph-mass spectrometer (GC-MS). These partially resolved components are directed to the MS as they evolve from the trap. The total efflux pressure changes in the ion source are analogous to the GC output, and pos. identification can be performed within the detection limits of the spectrometer. The technique has broad application in organic analysis. Figure 7 and the associated discussion on page 843 show the manner in which the trap can be applied to a variety of analytical applications. Of note are the figures using valves and the teaching that carrier gas can be separated prior to volatilization.

In the paper Des Marais teaches variable-temperature cryogenic trap for the separation of gas mixtures. A new variable-temperature cryogenic trap enables simple gas mixtures to be separated. The trap design consists of a U-trap wrapped with resistance wire and insulated from an enclosing liquid N bath by a 3-mm annular air space. By passing the proper current through the resistance wire, the U-trap can be warmed to the proper temperatures necessary for liberating individual components of a gas mixture. The cold trap can separate both CO_2 and SO_2 fractions from a CO_2-SO_2-H_2O mixture with purities exceeding 99%. The trap can isolate methane and ethane from a natural gas sample at purity levels exceeding 99.7 and 98%, respectively.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate a cold trap as taught by Crosmer or Des Marais in the method of Schafer or van der Weide because of the ability to separate molecules and inject them into a vacuum analysis system as shown by Crosmer. The Zheng abstract shows that a system such as those of Schafer or van der Weide would have been operated under a vacuum to prevent absorption of water vapor.

4. Claims 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Szpunar-Lobinska in view of Crosmer or Des Marais (last two as described above). In the paper Szpunar-Lobinska studied interferences in ultratrace speciation of organolead and organotin by gas chromatography with atomic spectrometric detection. The spectrometric detection techniques

were atomic absorption spectrometry (AAS) and/or microwave induced plasma atomic emission spectrometry (MIP AES). The AAS technique would measure submillimeter absorptions. Particular attention was given to the effects of matrix coextractives and reagents impurities introduced during sample preparation. Their influence on the detection limits is discussed in terms of baseline noise level, blank value, formation of artifacts and signal suppression. Loss of column resolution during the analysis of some matrixes was observed. Szpunar-Lobinska does not teach a trap to concentrate them.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the method and means for condensing trace air contaminates from gases as taught by Crosmer or Des Marais into the Szpunar-Lobinska method and apparatus for the mixture separation benefits taught by Crosmer or Des Marais.

5. Claims 1-15, 20-22 and 24-30 are allowed for the reasons of record.

6. Applicant's arguments with respect to claim 16-19 have been considered but are moot in view of the new ground(s) of rejection.

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The additionally cited art relates to cold trap systems and microwave or submillimeter analysis. Three references are also listed that were previously sent with the advisory action. Consequently copies of those references are not included.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arlen Soderquist whose telephone number is (571)272-1265. The examiner can normally be reached on Monday-Thursday and Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Jill Warden can be reached on (571) 272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Arlen Soderquist/
Primary Examiner, Art Unit 1797